



**Implementation Support Document
ISD 341-2.0**

Engineering Standards Manual Introduction

Los Alamos National Laboratory

Issue Date: 10/25/06

Issuing Authority: Associate Director Engineering & Engineering Sciences

Issued By: W. Scott Gibbs, ADE

Contact: Conduct of Engineering Office (CENG), 665-2780

Table of Contents

1.0 INTRODUCTION	3
1.1 SUMMARY	3
1.2 PURPOSE	4
1.3 SCOPE	5
1.4 REQUIREMENTS	5
1.5 REFERENCES	5
1.6 DEFINITIONS AND ACRONYMS	5
1.7 CHANGE CONTROL	5
1.8 IMPLEMENTATION	5
1.9 RECORD OF REVISIONS	5
1.10 ASSISTANCE	5

1.0 Introduction

1.1 Summary

This institutional Engineering Standards Manual (ESM) establishes the technical and administrative requirements of the LANL Engineering Standards established by Implementing Procedure [IMP 341](#), *Conduct of Engineering* (CoE).

Except as noted, the Engineering Standards are mandatory documents and apply to all LANL and subcontracted personnel performing design, fabrication, construction, and maintenance services for programmatic and facility work at LANL.

The Engineering Standards implement applicable DOE Orders and other Contract requirements.

The scope of the Engineering Standards includes the *Engineering Standards Manual* (ISD 341-2) as well as three mandatory companion documents. Also included with the Standards is a set of non-mandatory Design Guides.

The topical breadth and application of the Standards are summarized in Table 1 below and shown in much greater detail by the [“LANL Engineering Standards Scope and Applicability Matrix.”](#)

Table 1 LANL Engineering Standards Breadth and Application – Summary

ENGINEERING STANDARD DOCUMENT	FACILITY	PROGRAMMATIC*
<u>Eng Standards Manual Chapter</u>		
Introduction (this document)	X	X
General	X	X
Fire Protection	X	
Civil	X	
Architectural	X	
Structural	X	X
Mechanical	X	X
Electrical	X	X
Instrumentation and Control	X	X
Security	X	X
Hazardous Process	X	X
Radiation Protection	X	X
Nuclear	X	X
Welding and Joining	X	X
Sustainable Design	X	
Commissioning (when issued)	X	
IBC Building Safety Program	X	alterations meet App B
LANL Master Specifications Manual	X	X
LANL Standard Drawings and Details	X	X
LANL Drafting Standards Manual	X	when added
Design Guides (guidance)	X	X
* Also applicable when such systems are performing the same functions as facility systems (e.g., cooling towers, electrical supply, etc.); see subsection on Programmatic Applicability below.		

Standards Discipline Points of Contact (POCs) are the delegated Authorities Having Jurisdiction (AHJ) for judgments on the Standards per IMP 342, *Design Authority*. Interpretations and variances are addressed in ESM Chapter 1, Section Z10, *General Requirements for All Disciplines*.

Organization of Standards

ESM chapters are organized by the UniFormat system of the Construction Specifications Institute (CSI).

Master Specifications are arranged by the CSI MasterFormat 2004 system.

Standard Drawings and Details are numbered by the National CAD Standard and UniFormat systems.

Programmatic Applicability: In addition to the matrices of applicability discussed above, the ESM shall be applied to programmatic equipment as follows:

- A. Headings in ESM chapter sections followed by “Programmatic and Facility” or a bold capital “P” or “P&F” help to indicate that subsection shall be complied with by all of LANL, including programs.
- B. Furthermore, programmatic structures, systems, and components (SSCs) performing the same function as facility equipment shall be considered “facility” from the standpoint of being required to follow the entire LANL Engineering Standards (i.e., follow everything in the ESM, Master Specifications Manual, and Drafting Manual. Examples include buildings, transportables, HVAC equipment, electrical equipment, etc.).

1.2 Purpose

The purpose of the LANL Engineering Standards is to define the technical requirements for design, fabrication, construction, repair and replacement for programmatic and facility work at LANL including maintenance and modification of existing equipment and facilities, and new facilities and equipment.

This manual is established and authorized by [IMP 341](#), *Conduct of Engineering*, and is governed by Institutional Policy [IP 340](#), *Engineering*. Taken together, they document and define how the engineering-related elements in the paragraph above are performed by or for LANL.

The LANL Engineering Standards, in conjunction with [ISD 341-1](#), *Engineering Processes Manual*, and [ISD 341-3](#), *Engineering Training and Qualifications Manual*, provide a framework for the CoE Program for meeting customer needs in a safe, secure, compliant, and quality manner.

LANL Contract Appendix G contains provisions considered necessary to safety. Compliance with App. G and proper maintenance and quality assurance will result in installations with minimal hazards, but not necessarily efficient, convenient or adequate for changing mission requirements. Therefore, the LANL Engineering Standards include requirements in addition to the requirements of App. G based on:

- unique site expectations relative to existing national codes and standards,
- justifiable unique site application or configuration; or
- site-specific lessons learned.

The ESM also establishes a formal system to control the initiation, preparation, revision, and approval of engineering requirements relative to the national codes, standards and directives listed in LANL Contract App. G and unique site-specific engineering criteria.

The establishment of the Engineering Standards thus provides a method for LANL’s compliance to App. G and a consistent level of quality in the design, construction, and maintenance of LANL systems, structures, and components.

1.3 Scope

The LANL Engineering Standards are institutional documents, and as such, apply to all LANL and subcontracted personnel, including those performing design, fabrication, construction, repair, and replacement. LANL Engineering Standards apply to all activities performed by and for LANL throughout the design, operation and maintenance, and other project lifecycle phases.

1.4 Requirements

The LANL Engineering Standards are written to implement contractual requirements relating to the CoE Program.

1.5 References

The LANL Engineering Standards are written using numerous references, including national codes and standards and DOE Orders, Guides, Standards, and Handbooks that contain mandates and best practices.

The ESM captures such references and others such as lessons learned, generally as footnotes.

1.6 Definitions and Acronyms

Terms used in the LANL Engineering Standards are defined in ESM Chapter 1 Section Z10. When possible, definitions are derived from higher-tier requirement and reference documents with the references listed parenthetically after the definition. In addition, acronyms are defined at their first use in each section.

1.7 Change Control

Development, review, approval, issuance, and revision of the ESM and companion documents are governed by ESM Chapter 1 Section 100. The ESM including its revisions are issued under the approval signature of the Associate Director Engineering and Engineering Sciences (ADE), the Issuing Authority for the manual. However, the CENG Office Director is authorized by ADE to issue revisions as needed.

The CENG Office has full administrative control for this manual and its associated companion documents.

1.8 Implementation

Personnel shall not deviate from the LANL Engineering Standards in developing the technical project requirements (including programming documents, functional and operational requirements, and performance criteria), in design, in practice (execution), or in written direction to any subcontractor unless such variance is formally granted as described in ESM Chapter 1 Section Z10.

Project managers shall ensure that subcontracts for design or construction require compliance with applicable portions of the Standards (e.g., non-hazardous facilities would not follow those requirements).

1.9 Record of Revisions

Rev. 0: Initial issue October 25, 2006 based on material in former IMP 342, *Engineering Standards*, and ESM Chapter 1 Section Z10. Design Guides added to scope.

1.10 Assistance

The LANL Engineering Standards, including this Introduction to the ESM, are online at <http://engstandards.lanl.gov>. Please contact the Discipline POCs or Standards Manager/[General POC](#) for upkeep, interpretation, and variance issues. Training on the LANL Engineering Standards is available and highly recommended for users of the Standards. There is an introductory course as well as several discipline-specific courses; see http://engstandards.lanl.gov/trn_courses.htm.